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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/357,507	07/20/1999	KIYOSHI TAGUCHI	10059-286	9338

570 7590 06/17/2003

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EXAMINER
LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 06/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/357,507	TAGUCHI ET AL.	
	Examiner	Art Unit	
	Jennifer A. Leung	1764	

-- Th MAILING DATE of this communication app ars on th cover sheet with the correspondence address --

Peri d for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,6,8-11,21 and 23-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,6,8-11,21 and 23-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 July 1999* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. Applicant's amendment submitted on March 27, 2003 has been received and carefully considered. The submitted changes to the Specification are acceptable. Claims 12-17, 19-20 and 22 have been cancelled. Claims 1, 3-4, 6, 8-11, 21 and 23-26 remain active.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "two or more reaction segments... connected in parallel," must be shown or the feature canceled from the claim. No new matter should be entered. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 3-4, 6, 8-11, 21 and 23-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 1, it is unclear as to the structural limitation applicants are attempting to recite by, "wherein said means for heating the downstream side of said catalyst bed is the reformed gas..." (lines 8-9), since the "reformed gas" is not considered an element of the apparatus.

With respect to claim 21, it is unclear as to the structural limitation applicants are attempting to recite by, "said means for heating said downstream side of said catalyst bed comprises at least a portion of said reformed gas..." (lines 10-11), since the "reformed gas" is not considered an element of the apparatus.

With respect to claim 26, the language of the claim is drawn to a method limitation, as it is unclear as to the structural limitation applicants are attempting to recite by, "said reformed gas has a first direction... and a second direction..." (lines 2-4), since "said reformed gas" is not considered an element of the apparatus.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 8, 9, 11, 21 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Wössner (U.S. 3,962,869).

With respect to claim 1, Wössner (FIG. 5; column 5, lines 26-46; column 1, lines 52-68) discloses an apparatus comprising:

– A reaction segment (reactor **32**) having a catalyst bed (catalyzer **32'**);

– A first gas inlet (comprising heat pipe **33**) and a first gas pathway (i.e., defined by the directional flow arrows) capable of supplying a first gas to said reaction segment **32**;

– An second gas supplying segment (comprising the perpendicularly connected inlet to heat pipe **33**) capable of supplying a second gas to the first gas pathway;

– A cooler for cooling an upstream side (i.e., the right side) of said catalyst bed **32'** (i.e.,

the second heat pipe comprising evaporation region **35** for absorbing heat using a fluid working medium); and

– Means for heating a downstream side (i.e., the left side) of the catalyst bed **32'**, wherein the means for heating comprises the first gas in a portion of the first gas pathway located in proximity to said catalyst bed **32'** and separated from the catalyst bed **32'** by a wall (defined by pipe **33**, **34**) so as to heat the downstream side of the catalyst bed **32'** by the first gas before passing through said cooler **35**.

With respect to claim 8, Wössner (FIG. 5; see directional flow arrows) disclose the first gas pathway has a first direction prior to passing through the cooler **35**, and a second direction passing through the catalyst bed **32'**, wherein the first and second direction are opposing.

With respect to claim 9, Wössner (FIG. 5) disclose the reaction segment **32** is located outside the reformed gas pathway.

With respect to claim 11, Applicants state on page 8, lines 1-5, of the response dated March 27, 2003 that, "Figure 4, for example, clearly shows the hydrogen purifying apparatus wherein two or more reaction segments are connected in parallel." Therefore, in comparing the apparatus of Wössner (FIG. 5) with the instant apparatus of Figure 4, Wössner discloses two or more reaction segments are connected in parallel.

With respect to claim 21, Wössner disclose an apparatus comprising:

– A reaction segment (reactor **32**) having a catalyst bed (catalyzer **32'**);

– A first gas inlet (comprising heat pipe **33**) and a first gas pathway (i.e., defined by the directional flow arrows) capable of supplying a first gas to said reaction segment **32**;

– An second gas supplying segment (comprising the perpendicularly connected inlet to heat

pipe **33**) capable of supplying a second gas to the first gas pathway;

– A cooler for cooling an upstream side (i.e., the right side) of said catalyst bed **32'** (i.e., the second heat pipe comprising evaporation region **35** for absorbing heat using a fluid working medium); and

– Means for heating a downstream side (i.e., the left side) of the catalyst bed **32'**, wherein said first gas pathway at least partially surrounds said catalyst bed (see flow arrows, partially within the catalyst bed **32'**), said means for heating the downstream side of the catalyst bed comprising at least a portion of the first gas in the first gas pathway (i.e., flow within heat pipe **33**), such that said first gas is inherently cooled in the first gas pathway by said catalyst bed **32'** before passing through the cooler **35**.

With respect to claim 26, no further structural limitations are recited, and therefore the apparatus of Wössner meets the claim, since "the reformed gas" is not considered an element of the apparatus. In any event, Wössner (FIG. 5, see directional arrows) disclose the reformed gas has a first direction prior to passing through said cooler **35**, and a second direction after passing through said catalyst bed **32'**, wherein the first direction and second direction are opposing.

Instant claims 1, 8, 9, 11, 21 and 26 structurally read on the apparatus of Wössner, since the utilization of the apparatus for the oxidation of carbon monoxide in a reformed gas is merely a matter of intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

5. Claims 1, 8, 10, 21 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Fauser (U.S. 2,898,183).

With respect to claim 1, Fauser (FIG. 1; generally, column 2, line 18 to column 3, line 47) discloses an apparatus comprising:

– A reaction segment having a catalyst bed (i.e., catalyst bed **B2**; column 2, lines 26-28);

– A first gas inlet (i.e., entering the lower part of tubular reaction vessel **A**) and a first gas pathway (i.e., the annular region defined by the walls of vessel **A** and the reaction segment comprising the catalyst bed; see directional flow arrows) for supplying the first gas to said reaction segment;

– A second gas supplying segment (i.e., conduit connecting to the first gas inlet, feeding **M**) for supplying a second gas to the first gas pathway;

– A cooler (i.e., heat exchanger **C1** comprising liquid coolant; column 2, lines 33-35) for cooling an upstream side of said catalyst bed **B2**; and

– Means for exchanging heat with a downstream side of the catalyst bed **B2**, wherein the means for exchanging heat comprises a portion of the first gas pathway located in proximity to said catalyst bed **B2** and separated from the catalyst bed **B2** by a wall so as to inherently conduct heat exchange with the downstream side of the catalyst bed **B2** by the first gas before passing through said cooler **C1**.

With respect to claim 8, Fauser (FIG. 1; see directional flow arrows) discloses the first gas pathway has a first direction (i.e., upward) prior to passing through the cooler **C1**, and a second direction (i.e., downward) passing through the catalyst bed **B2**, wherein the first direction and second direction are opposing.

With respect to claim 10, Fauser (FIG. 1) discloses the reaction segment (i.e., comprising catalyst bed **B2**) is tube-shaped and the first gas pathway before the passage through said cooler **C1** is formed around the reaction segment (i.e., pathway defined by the annular region with upward flow arrows).

With respect to claim 21, Fauser (FIG. 1; generally, column 2, line 18 to column 3, line 47) discloses an apparatus comprising:

– A reaction segment having a catalyst bed (i.e., catalyst bed **B2**; column 2, lines 26-28);

– A first gas inlet (i.e., entering the lower part of tubular reaction vessel **A**) and a first gas pathway (i.e., the annular region defined by the walls of vessel **A** and the reaction segment comprising the catalyst bed; see directional flow arrows) for supplying the first gas to said reaction segment;

– A second gas supplying segment (i.e., conduit connecting to the first gas inlet, feeding **M**) for supplying a second gas to the first gas pathway;

– A cooler (i.e., heat exchanger **C1** comprising liquid coolant; column 2, lines 33-35) for cooling an upstream side of said catalyst bed **B2**; and

– Means for exchanging heat with a downstream side of the catalyst bed **B2**, wherein said first gas pathway at least partially surrounds said catalyst bed **B2** (i.e., annular region between catalyst bed and reactor vessel wall) such that said means for exchanging heat comprises at least a portion of the first gas in the first gas pathway, and such that said first gas exchanges heat with the catalyst bed **B2** before passing through the cooler **C1**.

With respect to claim 26, Fauser (FIG. 1; see directional flow arrows) discloses the gas has a first direction (i.e., upward) prior to passing through said cooler **C1**, and a second direction

(i.e. downward) after passing through said catalyst bed **B2**, wherein the first direction and second direction are opposing.

Instant claims 1, 8, 10, 21 and 26 structurally read on the apparatus of Fauser, since the utilization of the apparatus for the oxidation of carbon monoxide in a reformed gas and the relative feed stream temperature (i.e. such that heating or cooling is conducted by the means for exchanging heat with a downstream side of the catalyst bed) is merely a matter of intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 6 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wössner (U.S. 3,962,869) or Fauser (U.S. 2,898,183).

With respect to claims 6 and 25, Wössner and Fauser, respectively, are silent as to a gas flow rate control valve located on the second gas supplying segment for changing an amount of the second gas to be supplied in correspondence with a temperature of the catalyst bed. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to provide a gas flow rate control valve for the second gas supplying segment in the apparatus of Wössner or Fauser, on the basis of suitability for the intended use and absent showing any unexpected results thereof, since the Examiner takes Official Notice that the use of flow rate control valves for the regulation of gas supply to a reaction zone on the basis of temperature control is well known in the art.

Response to Arguments

7. Regarding to the Drawings objection made above and in the prior Office Action dated November 27, 2002, applicants disagree with the objection and further state, "Figure 4, for example, clearly shows the hydrogen purifying apparatus wherein *two or more reaction segments* are connected in parallel." (Beginning on page 7, last paragraph). However, as indicated in the specification (page 19, first paragraph), Applicants disclose, "the present embodiment comprises a reaction chamber 28 formed on the periphery of a tube-shaped reformed gas flow pathway." Therefore, one of ordinary skill in the art would have interpreted the embodiment of Figure 4 to illustrate a *single, annular reaction segment*, rather than the

plurality of reaction segments as recited in the claims.

8. Applicant's arguments with respect to claims 1, 3, 4, 6, 8-11, 21 and 23-26 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

9. Claims 3, 4, 23 and 24 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Buswell et al. and Takahashi et al. are presented to illustrate the state of the art.

* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is 703-305-4951. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer A. Leung
June 15, 2003 JAL

Hien Tran

HIEN TRAN
PRIMARY EXAMINER